Claims

1. A method for GPS-based regional time synchronization comprising:

receiving, at a master site, information from a GPS satellite that indicates a position of the satellite and a satellite time-of-day;

determining, using the position of the satellite and a pre-determined position of the master site, a time-of-day error value that represents a difference between the satellite time-of-day, adjusted for a transit time of the information, and a corresponding master site time-of-day as reported by a master site, nanosecond-accurate clock; and

broadcasting to at least one slave site an indication of the time-of-day error value and the corresponding master site time-of-day.

2. The method of claim 1 further comprising the step of repeating the steps of receiving, determining, and broadcasting periodically.

3. The method of claim 2 further comprising the step of repeating the steps of receiving, determining, and broadcasting for each GPS satellite visible to the master site.

4. The method of claim 1 further comprising the steps of:

receiving, over a period of time at the master site, information from the GPS satellite that indicates positions of the satellite and satellite times-of-day;

determining, from the information received over the period of time, a rate-of-change of time-of-day error values; and

broadcasting to at least one slave site the rate-of-change of time-of-day error values.

5. The method of claim 1 wherein broadcasting comprises transmitting via an inter-site network.

6. A method for GPS-based regional time synchronization comprising:

receiving, at a slave site and at a time indicated by a slave site clock, information from a GPS satellite that indicates a position of the satellite and a first satellite time-of-day;

storing information that indicates the time indicated by the slave site clock and how the time indicated by the slave site clock differs from the satellite time-of-day;

receiving, at the slave site, an indication of a time-of-day error value and a corresponding master site time-of-day, as reported by a master site, nanosecond-accurate clock, wherein the time-of-day error value represents a difference between a second satellite time-of-day, adjusted for a transit time to the master site, and the corresponding master site time-of-day;

determining a clock correction value for the slave site using the stored information, the time-of-day error value, and the corresponding master site time-of-day; and

synchronizing a slave site clock with the master site using the clock correction value.

7. The method of claim 6 wherein the step of storing comprises storing the time indicated by the slave site clock and the satellite time-of-day adjusted for a transit time to the slave site.

8. The method of claim 7 wherein the step of determining comprises determining the clock correction value by using the difference between the time-of-day error value and a slave error value equal to the difference between the time indicated by the slave site clock and the first satellite time-of-day adjusted for the transit time to the slave site.

9. The method of claim 8 wherein the master site time-of-day corresponds to the time indicated by the slave site clock.

10. The method of claim 6 further comprising the step of receiving, at the slave site from a master site, a rate-of-change of time-of-day error value, wherein the rate-of-change of time-of-day error value is additionally used to determine the clock correction value.

11. The method of claim 10 further comprising the steps of:

signaling to wireless units according to the synchronized slave site clock for use in location determination of the wireless unit.

12. A base site comprising:

a GPS receiver arranged to receive information from a GPS satellite that indicates a position of the satellite and a first satellite time-of-day;

a clock coupled to the GPS receiver that indicates a time at which the GPS receiver received the information;

a clock controller, coupled to the GPS receiver and the clock, arranged to store information that indicates the time indicated by the clock and how the time indicated by the clock differs from the first satellite time-of-day, further arranged to receive an indication of a time-of-day error value and a corresponding master site time-of-day, as reported by a master site, nanosecond-accurate clock, wherein the time-of-day error value represents a difference between a second satellite time-of-day, adjusted for a transit time to the master site, and the corresponding master site time-of-day, further arranged to determine a clock correction value using the stored information, the time-of-day error value, and the corresponding master site time-of-day, and further arranged to synchronize the clock with the master site, nanosecond-accurate clock using the clock correction value.

13. The base site of claim 12 wherein the clock comprises a quartz oscillator.

14. The base site of claim 12 wherein the clock controller stores the time indicated by the clock and the first satellite time-of-day adjusted for a transit time to the base site.

15. The base site of claim 14 wherein the clock controller determines the clock correction value by using the difference between the time-of-day error value and a base site error value equal to the difference between the time indicated by the clock and the first satellite time-of-day adjusted for the transit time to the slave site.

16. The base site of claim 15 wherein the master site time-of-day corresponds to the time indicated by the clock.

17. The base site of claim 12 wherein the clock controller is further arranged to receive a rate-of-change of time-of-day error value, wherein the rate-of-change of time-of-day error value is additionally used to determine the clock correction value.

18. The base site of claim 17 further comprising a transmitter arranged to signal wireless units according to the synchronized clock for use in location determination of the wireless unit.